

FEEDING ECOLOGY OF SOUTHERN FUR SEALS
(*ARCTOCEPHALUS* SPP.) AND THEIR MANAGEMENT
AT HEARD AND MACQUARIE ISLANDS
(EXTENDED ABSTRACT)

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Heard Island (53°S, 73°E) is 4000 km southwest of Australia and Macquarie Island (54°S, 159°E) is 1500 km southeast of Australia. Heard is south of the Antarctic Convergence and Macquarie is north of it. Populations of southern fur seals *Arctocephalus* spp. are recovering at both islands, after commercial sealing eliminated them in the nineteenth century.

At Heard Island pups of the Antarctic fur seal *A. gazella* increased at an exponential rate $r=0.207$, which implies an annual rate of increase of 23% (coefficient of determination, $R^2=0.95$) between 1963 and 1988 (SHAUGHNESSY and GOLDSWORTHY, 1990). This is likely to be an over-estimate because of suspected under-counting in earlier years. For 1987/88 the number of pups was estimated to be 248 based on tagging and counting. We also saw one pup of the Subantarctic fur seal *A. tropicalis* (GOLDSWORTHY and SHAUGHNESSY, 1989). After the breeding season, many male Antarctic fur seals come ashore to moult; we estimated by counting and extrapolating that 15000 were ashore in late February 1988. Such a large number of seals is unlikely to have derived from Heard Island. These males could be from the small colony at Kerguelen (500 km away) or from the main breeding locality at South Georgia (6600 km away). One or both of these islands could also be contributing to the breeding colony at Heard Island.

Three species of fur seal breed at Macquarie Island: *A. gazella*, *A. tropicalis* and the New Zealand fur seal *A. forsteri* (SHAUGHNESSY *et al.*, 1988). Pups were first recorded in 1954/55. Pup numbers have been increasing at an exponential rate $r=0.100$ since then, which implies an annual rate of increase of 10.5% ($R^2=0.66$, Fig. 1); 68 of three species were born in 1990/91. The major breeding species are *A. gazella* and *A. tropicalis*; *A. forsteri* has also bred recently. Breeding territories may contain animals of each species; most adult females are *A. gazella* and most males holding territories are *A. tropicalis*.

In March–April almost 2000 *A. forsteri* are ashore at Macquarie Island; most are moulting males and are probably from colonies in New Zealand or its subantarctic islands. At the northern end of Macquarie Island, North Head peninsula, they have been increasing at an exponential rate $r=0.035$ since counts began in 1950, which implies an annual rate of increase of 3.6% ($R^2=0.74$, Fig. 2).

Studies of feeding ecology have been conducted on fur seals at both Heard and

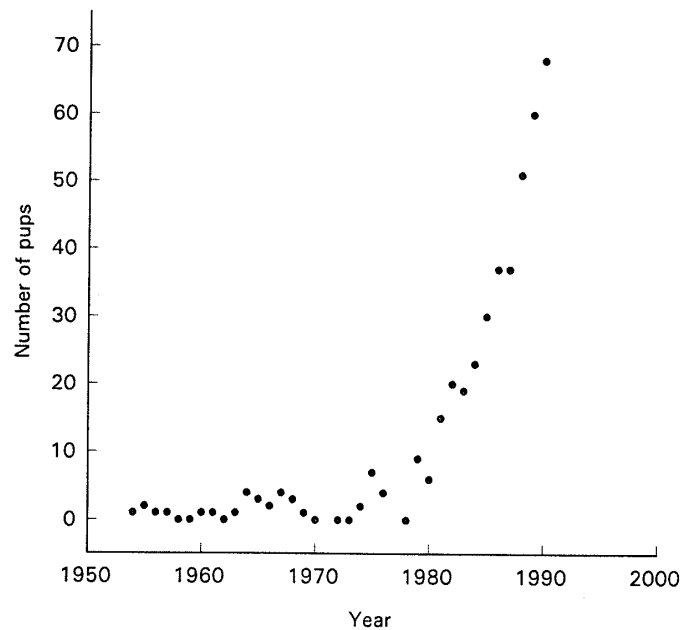


Fig. 1. Numbers of southern fur seal (*Arctocephalus*) pups at Macquarie Island between 1954/55 and 1990/91.

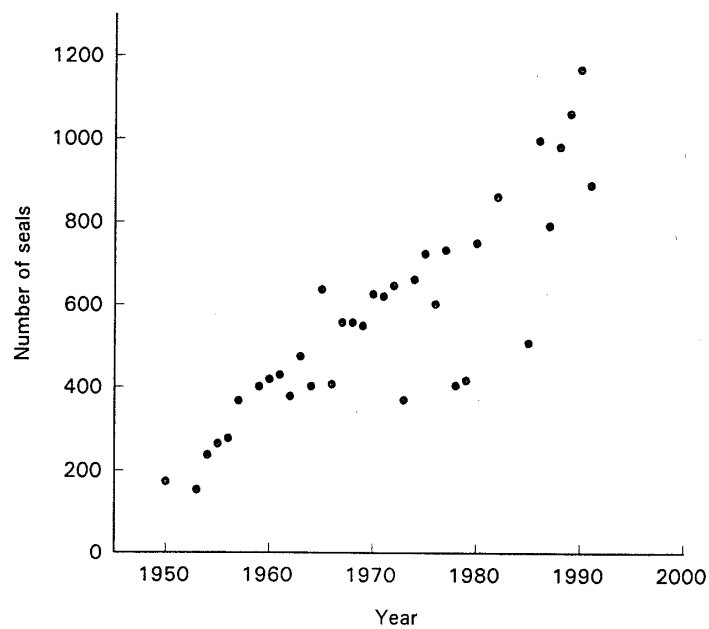


Fig. 2. Counts of fur seals ashore on North Head peninsula, Macquarie Island in March-April each year between 1950 and 1991. Most are New Zealand fur seals *A. forsteri*.

Macquarie Islands. The seals feed predominantly on pelagic myctophid fish (GREEN *et al.*, 1989, 1990). This is in marked contrast to *A. gazella* at South Georgia, which feed almost exclusively on krill *Euphausia superba*.

Lactating adult females at Heard Island forage for 5 to 7 days between shore attendance bouts lasting 1.5 days. Foraging trips at Macquarie Island are shorter (1 to 3 days), with some females making trips that are completed in one night. Thus Macquarie Island animals feed closer inshore than those from Heard Island.

Time-depth-temperature recorders deployed on fur seals at Macquarie Island indicate that they dive between dusk and dawn near the surface. Similar studies will be conducted at Heard Island in 1992 by Dr. K. GREEN (Australian Antarctic Division).

Heard Island (and the neighbouring McDonald Islands) are managed as an Australian External Territory by the Australian Antarctic Division. Flora and fauna there (including fur seals) are protected under the Heard Island and McDonald Islands Environment Protection and Management Ordinance 1987. Macquarie Island is managed by the Tasmanian government as a nature reserve, which provides protection to the fur seals there. Waters around both islands are part of the Australian Fishing Zone where fur seals are the responsibility of the Australian Antarctic Division and the Australian National Parks and Wildlife Service.

We will continue to estimate population levels at both Heard and Macquarie Islands, and to monitor the interaction between bulls of the two species at Macquarie. We still need to describe the feeding location and feeding behaviour of adult female fur seals.

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